
QPC74 Recorded Announcement Trunk Card

Introduction

The QPC74 Recorded Announcement Trunk Card is a peripheral equipment (PE) device that can be installed in any peripheral shelf or NT8D13 Peripheral Equipment (PE) Module. The recorded announcement trunk card interfaces four recorded announcement trunk lines to a Meridian 1 switch. It supports both continuous and start/stop modes of operation. Each trunk is independently configurable using the Trunk Administration Program (LD 14) and the Trunk Route Administration Program (LD 16).

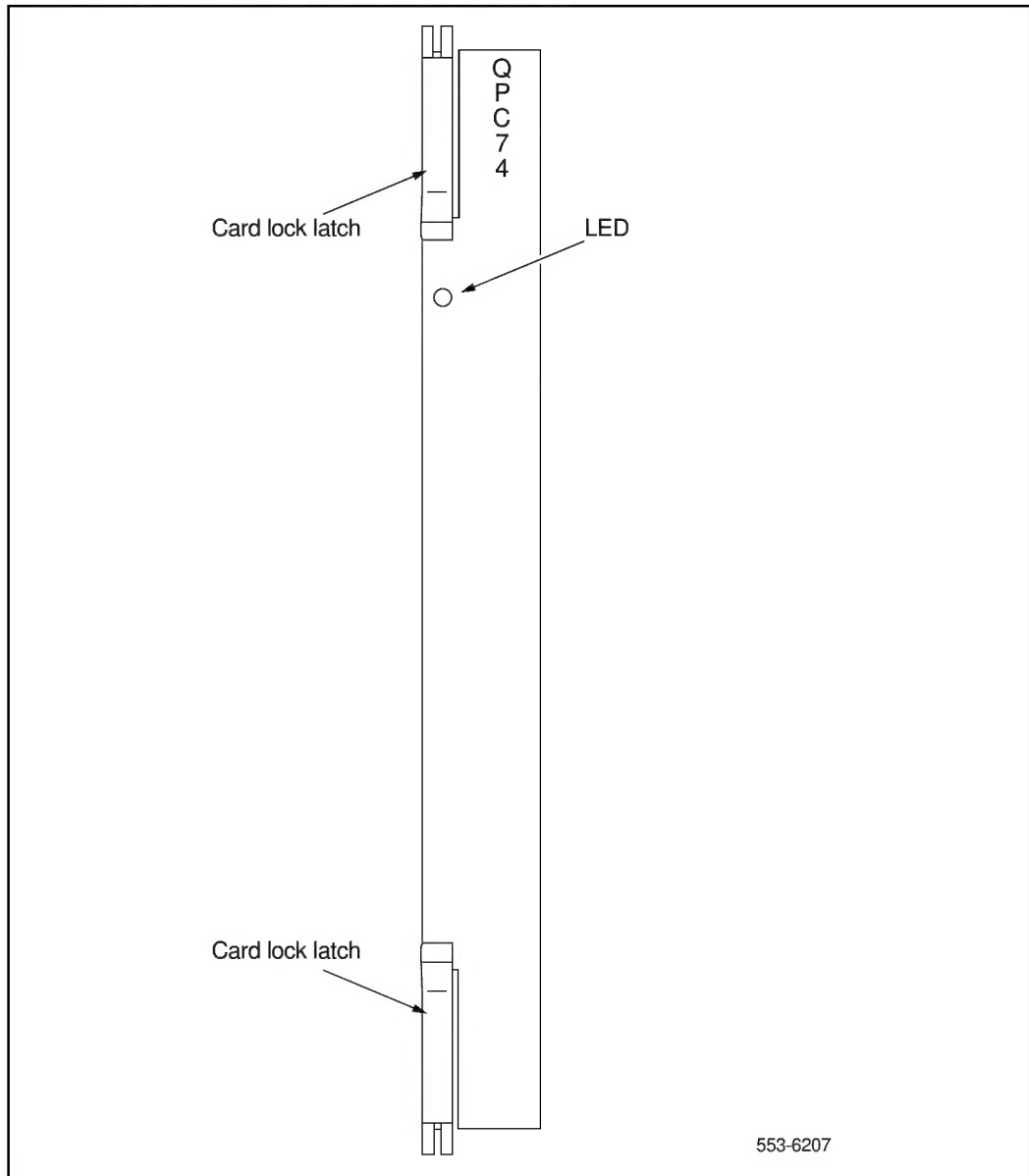
Physical description

The recorded announcement trunk card mounts in any PE slot. The four trunk circuits and common multiplexing circuitry are mounted on a 31.74 cm by 25.4 cm (12.5 in. by 10 in.) printed circuit board.

The recorded announcement trunk card connects to the backplane through an 80-pin connector shroud. The backplane is then cabled to the input/output (I/O) panel, which is cabled to the main distribution frame (MDF) by 25-pin cables. Trunk lines connect to the card at the MDF. See *Meridian 1 system installation procedures* (553-3001-210) for termination and cross connect information.

The faceplate of the card is equipped with a red light emitting diode (LED) (see [Figure 64](#)). This LED should only be lit when there is a problem with the card. If the LED operates in any other manner, such as continually flashing or remaining weakly lit, the card should be replaced.

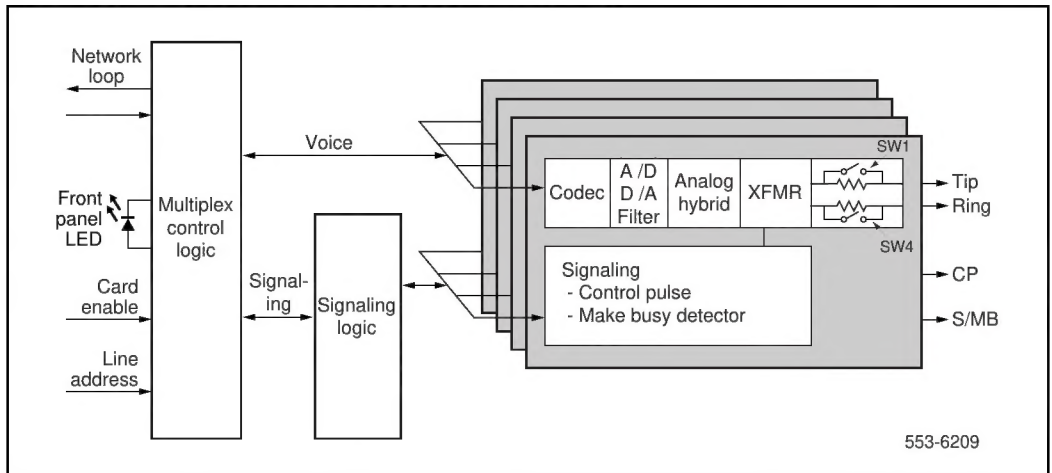
Figure 64
Recorded announcement trunk card—faceplate



Functional description

Figure 65 shows a block diagram of the major functions contained on the recorded announcement trunk card. Each of these functions is described on the following pages.

Figure 65
Recorded announcement trunk card—block diagram



Card interfaces

The recorded announcement trunk card passes both voice and signaling data over the network loop. Network loops are discussed in detail in “Peripheral equipment” on page 22.

Trunk interface units

The recorded announcement trunk card contains four identical and independently configurable trunk interface units (also referred to as circuits). Each unit provides impedance matching and a balance network in a signal transformer/analog hybrid circuit. The impedance matching and a balance network allow selectable termination of tip and ring impedance (up to 600 Ω) by providing jumper-selectable 300 Ω distributing resistors in each leg. This allows up to ten trunks to be bridged to a single low-impedance (2 Ω or 4 Ω) source. A 600 Ω impedance can also be selected for interface with a 600 Ω impedance source.

Four codecs are provided for performing A/D and D/A conversion of trunk analog voiceband signals to digital PCM signals. Each codec supports one trunk interface unit.

Clamping diodes protect the input filter and hybrid from over-voltages and provide AC coupling. Audio signals received from the circuit card tip and ring terminals (T and R) are passed through the transformer to the low-pass A/D filter in the hybrid circuit. The A/D filter limits the frequency spread of the input to a nominal 200 Hz through 3400 Hz bandwidth, and amplifies the signal for application to the analog input of the hybrid codec. A resistor in the hybrid limits the codec input current. The hybrid codec encodes the analog signal into a digital signal that is applied to the common multiplexing circuitry.

Multiplex control

The multiplex control logic is common to all four channels. This logic interfaces the individual trunk circuits to the peripheral bus signaling channel. Circuits are provided in the multiplex control logic to retime the digital signals received from the peripheral bus. Other circuits decode the address information contained on the peripheral bus to enable the individual trunk circuits during their selected time slots. Logic is also provided to enable or disable the front panel LED to indicate the service state of the card. The multiplex control logic is discussed in detail in “Peripheral equipment” on page 22.

Operation

The optional applications, features, and signaling arrangements for each unit on the recorded announcement trunk card are assigned through the Trunk Administration (LD 14) and Trunk Route Administration (LD 16) programs and/or jumper strap settings on the card. See the *X11 input/output guide* for detailed information on assigning features and services to trunks.

The Recorded Announcement (RAN) feature allows the customer to:

- define the type of call intercept
- allow the connection of a customer-provided recorded announcement machine to the Meridian 1 system
- specify the language RAN route to be used for a Multi-Language Wake-Up call

A customer can specify up to five different intercept conditions that result in a connection to the recorded announcement machine. Each intercept condition has a different announcement. An example of an announcement for each intercept treatment is listed below:

- Access denied: “You are not allowed access to the number you have dialed. Please dial 0 for assistance.”
- Call to a vacant number: “The number you have dialed is not in service. Please check your directory and call again.”
- Maintenance busy number: “The number you have dialed is temporarily out of service. Please check the number and dial again. If you are calling from outside, please stay on the line and an operator will help you.”
- Code or toll restricted call by a TLD station or a tie trunk: “You are not allowed access to the number you have dialed. Please dial 0 for assistance.”
- Calls to a Listed Directory Number (LDN): “The call cannot be completed as dialed. Please check the number and try again.”

Table 36 lists the intercept treatments.

Table 36
Intercept treatment and associated types of announcements

Intercept Situation	Station	Attendant Extended Calls	Calling Party	
			Tie Trunk	CCSA/DID Trunk
Access Denied	C (O)	C (O)	C (O)	C (A)
Call to a vacant number	C (O)	C (O)	C (O)	C (A)
Maintenance busy number or RPE failure	C (O)	C (O)	C (O)	C (A)
Code/toll restricted call by a toll denied (TLD) station or a tie trunk	C (O)	C (O)	C (O)	N/A
Calls to Listed Directory Number (LDN)	C (O)	C (O)	C (O)	N/A
Legend: C = Choice of overflow tone, intercept to attendant, or recorded announcement (default in brackets) O = Overflow tone (ovf) A = Intercept to the attendant (att) N/A = Not applicable				

Recorded announcement modes of operation

Each trunk unit can be configured to operate in one of these modes of operation:

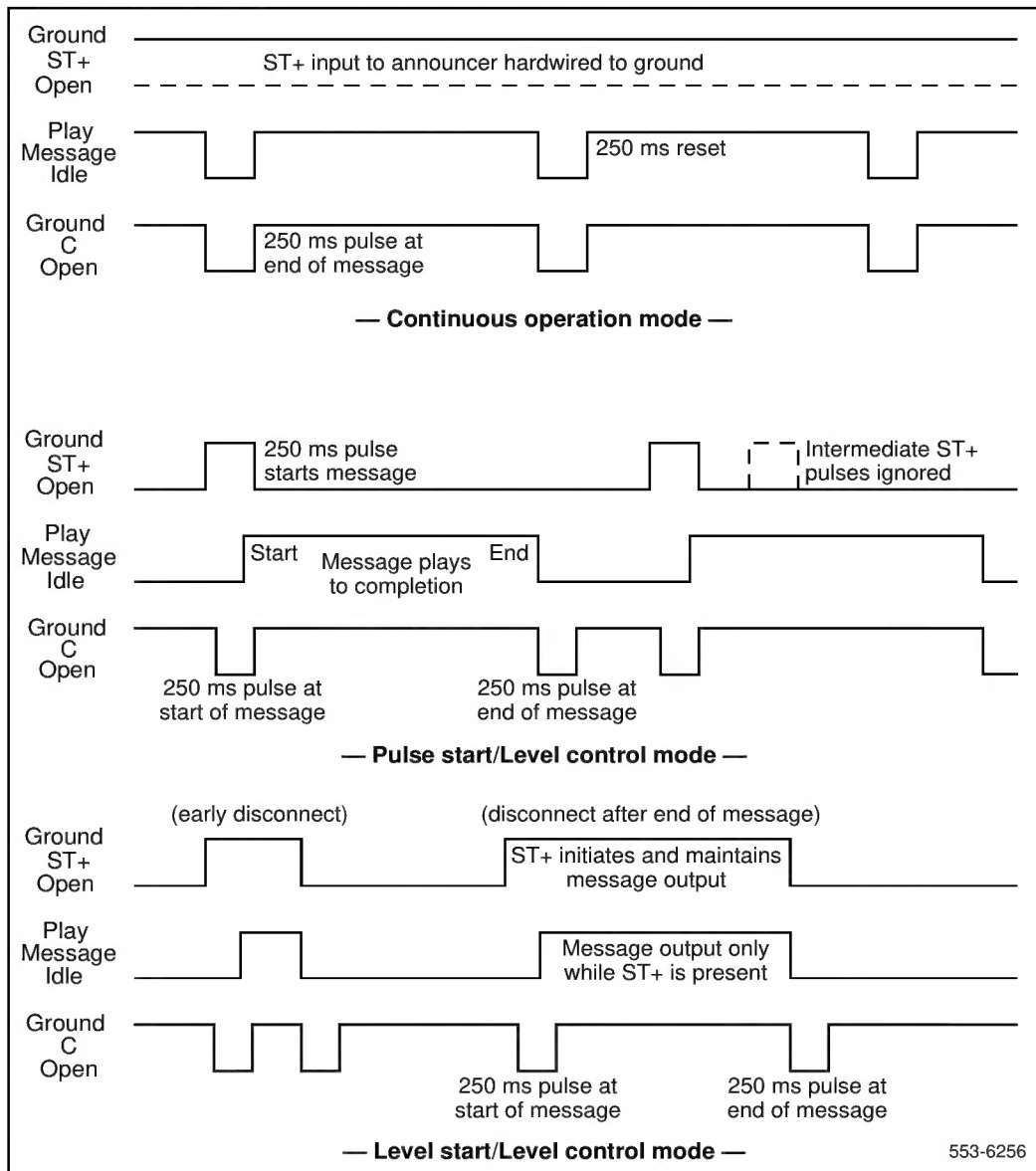
- continuous operation
- pulse start mode
- level start mode

Figure 66 shows the relationship of control signals to message playback for the operating modes available in announcement machines. The signal names shown in the figure are typical of Northern Telecom digital announcement machines and are used here for comparison to other manufacturer's equipment that might be used.

Continuous operation mode In the continuous operation mode (sometimes called the *Audichron* mode), a message is constantly played, over and over again. Callers “barge in” on a playing message or are provided with a ringback tone until the message begins its next playing. The start line (ST+) on the announcement machine is hardwired to always be active. At the end of each message, a pulse is issued on the “CP” line that is used by the trunk unit to cut through to the waiting call.

Note: The “SMB” (busy) signal line is used to indicate availability of an announcement machine message to the trunk unit when configured for the continuous operation mode. This signal is made active (ground) by the announcement machine if the channel contains a recorded message and is in an on-line condition. The “SMB” line is not connected to a trunk unit when configured for start mode operation.

Figure 66
RAN control signals



Start modes In a start mode (sometimes called the *Code-a-Phone* or *start-stop* mode), playback of a message does not begin until a start pulse is received by the announcement machine. Two subcategories of the start mode exist pulse start and level start.

In the pulse start mode, a start pulse activates playback of a message that continues until completion (see [Figure 66](#)). The announcement machine ignores all other start pulses that might occur until the message is complete.

In the level start mode, the start signal is a “level” rather than a pulse. The leading edge of the start signal initiates message playback that continues until either the trailing edge of the start signal occurs or the end of the message is reached. A message that is terminated by the trailing edge of a level start signal is immediately reset and again made available for playback.

Electrical specifications

This section lists the electrical specifications of the recorded announcement trunk card.

Trunk interface electrical characteristics

[Table 37](#) gives the electrical characteristics for the recorded announcement trunk interface units on the card.

Table 37
Trunk interface electrical characteristics

Characteristic	Specification
Circuits per card	4
Card options	Selectable input source impedance: — Use with a low-impedance source to allow bridging of many trunks to the same channel — Use with a 600 Ω impedance source on a one-to-one basis
Transformer Impedance	600 Ω
Line Leakage	30,000 Ω
Effective Loss	2.5 dB

Power requirements

[Table 38](#) lists the power requirements for the recorded announcement trunk card.

Table 38
Recorded announcement trunk card—power requirements

Voltage	Tolerance	Current (typical)
+10.0 V dc	±5 %	30 mA.
−10.0 V dc	±5 %	30 mA.
+6.0 V dc	±1 %	80 mA.
−6.0 V dc	±1 %	80 mA.
−48 V dc	±12 %	350 mA.

Foreign and surge voltage protections

When telephone lines connected to the trunk circuit are exposed to foreign voltages by direct contact or induction (e.g., power line crosses or lightning), protection devices must be installed on the customer's premises. These devices must be capable of providing a path to ground from tip and ring for foreign voltages that exceed 600 V peak.

Environmental specifications

[Table 39](#) lists the environmental specifications for the recorded announcement trunk card.

Table 39
Environmental specifications

Parameter	Specifications
Operating temperature	0° to +60° C (+32 to +140° F), ambient
Operating humidity	5 to 95% RH (noncondensing)
Storage temperature	−40° to +70° C (−40° to +158° F)

Connector pin assignments

The recorded announcement trunk card brings the analog trunks to the PE backplane through an 80-pin connector shroud. The backplane is cabled to the input/output (I/O) panel on the rear of the module, which is then connected to the main distribution frame (MDF) by 25-pair cables.

Recorded announcement trunks connect to the recorded announcement trunk card at the MDF using a wiring plan similar to that used for line cards. A typical connection example is shown in [Figure 67](#), and a list of the connections to the recorded announcement trunk card is shown in [Table 40](#). See *Meridian 1 system installation procedures* (553-3001-210) for complete I/O panel connector information and wire assignments for each tip/ring pair.

Figure 67
 Recorded announcement trunk card—typical cross connection example

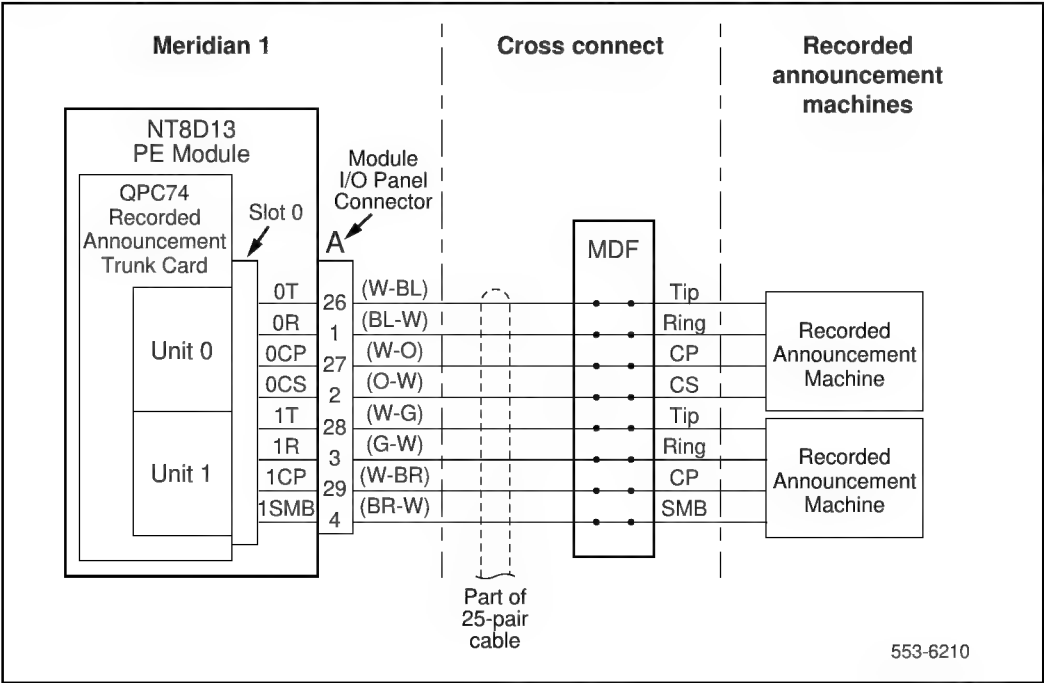


Table 40
Recorded announcement trunk card—backplane pinouts

Connector Pin	Signal	Unit	Termination
36A	Tip	0	To recorded announcement machine (see owners manual)
37A	Ring		
38A	CP		
39A	CS (SMB)		
29A	Tip	1	To another recorded announcement machine (or bridged)
30A	Ring		
31A	CP		
32A	CS (SMB)		
2A	Tip	2	To another recorded announcement machine (or bridged)
3A	Ring		
4A	CP		
5A	CS (SMB)		
9A	Tip	3	To another recorded announcement machine (or bridged)
10A	Ring		
11A	CP		
12A	CS (SMB)		

Configuration

The mode of operation for each unit on the card must be selected using switch settings on the card and by making service change entries in the Trunk Administration program (LD 14) and the Trunk Route Administration program (LD 16). See the *X11 input/output guide* for detailed information on assigning features and services to trunks. [Figure 68](#) shows the location of the switches.

Switch settings

The option switches for each recorded announcement trunk must be set to select the trunk interface impedance and type. The switch settings are shown in [Tables 41](#) and [42](#).

Software service changes

The trunk type, features, and signaling arrangement for each trunk are selected by making service change entries in the Trunk Administration program (LD 14). Refer to the Meridian 1 *X11 input/output guide* for LD 14 service change instructions.

Figure 68
Recorded announcement trunk card—switch and jumper locations

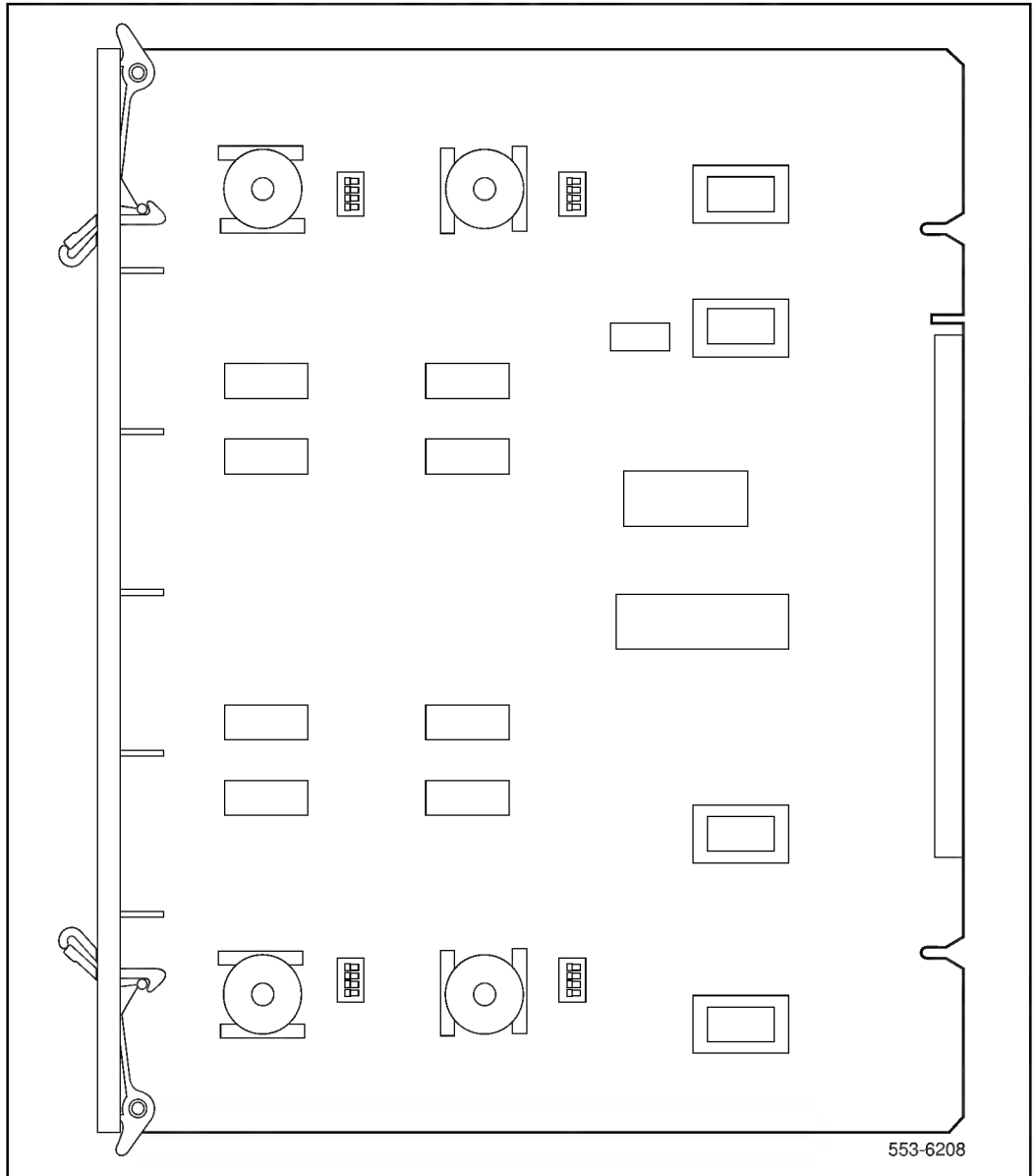


Table 41
Recorded announcement trunk card—switch settings for units 0 and 1

Application	Unit 0—Switch C35				Unit 1—Switch F35			
	1	2	3	4	1	2	3	4
Audichron (continuous mode)	off	off	on	off	off	off	on	off
Code-A-Phone (start–stop mode)	off	on	off	off	off	on	off	off
Cook Digital Announcer (continuous mode)	off	off	on	off	off	off	on	off
Cook Digital Announcer (start–stop mode)	off	on	off	off	off	on	off	off
Test or Music (600 Ω source impedance)	on	off	off	on	on	off	off	on

Table 42
Recorded announcement trunk card—switch settings for units 2 and 3

Application	Unit 2—Switch C5				Unit 3—Switch F5			
	1	2	3	4	1	2	3	4
Audichron (continuous mode)	off	off	on	off	off	off	on	off
Code-A-Phone (start–stop mode)	off	on	off	off	off	on	off	off
Cook Digital Announcer (continuous mode)	off	off	on	off	off	off	on	off
Cook Digital Announcer (start–stop mode)	off	on	off	off	off	on	off	off
Test or Music (600 Ω source impedance)	on	off	off	on	on	off	off	on

Applications

The Recorded Announcement (RAN) feature allows a customer to:

- define the type of call intercept
- allow the connection of a customer-provided recorded announcement machine to the system by means of QPC74 cards
- specify the language RAN route to be used for a Multi-Language Wake-Up call

A customer can specify up to five different intercept conditions resulting in connection to the recorded announcement machine. Each intercept condition has a different announcement. [Table 36, “Intercept treatment and associated types of announcements,” on page 154](#) lists intercept treatments.

For information on configuring recorded announcement features in software, see “Recorded Announcement” in *X11 features and services*.

Message recording

Messages are recorded in three different ways, depending on the noise environment of the recorded announcement machine.

- Quiet machine environment: Record the message at the machine site by using a handset.
- Noisy environment: Record a message on a remote cassette recorder away from the machine site. Connect the cassette recorder to the machine record input, and play the message into the recorder.
- Prerecorded announcement: Place the prerecorded tape directly into the machine. Machine-compatible prerecorded tapes can be obtained from Pastel or other manufacturers.

Recommendations

If announcement start is set for delay dial (DDL), intercept is connected to the announcement at the start of the recording.

- Keep the announcement recording to less than 12 seconds. Announcements of approximately 12 seconds apply one or two ringback tones to the calling party if the announcement is in progress when intercept is initiated.

If announcement start is set for immediate start (IMM), intercept is connected to the announcement the moment intercept is detected.

- The announcement should make sense to the calling party when connected at any point.
- Define the rate as two or more so the calling party receives the complete announcement.

Multi-language wake-up

As an enhancement to the Automatic Wake-Up (AWU) feature (X11 release 10), Multi-Language Wake-Up is an X11 release 16 feature that allows a customer to choose a language for a wake-up call. If AWU is enabled, up to six language-specific RAN route pairs (both a.m. and p.m. for each language) can be configured in the service change.

The languages, 0–5, correspond to RAN routes RAN1/RAN2 (for Language 0), LA11/LA12 (for Language 1)—all the way to LA51/LA52 (for Language 5) in the Customer Data Block (LD 15). The only requirement is that Language 0 (the default language routes RAN1 and RAN2) must be defined. If a specific language RAN is not accessible at wake-up time, the corresponding primary or secondary default language routes (RAN1 and RAN2) will be used.

For music RAN, RAN1 and RAN2 must be unique. However, the same RAN route can be shared among the five additional language RANs. If the same RAN route is shared, there must be as many RAN trunks defined for that route as the number of AWU RANs in the service change program to which it is assigned. For example, if RAN route 76 is assigned to LA11, LA21, LA41, and LA52, at least four RAN trunks should be defined. Since the order of trunk seizure is random, the announcement on shared RAN trunks should be identical.

When an AWU call is presented to a room and answered by the guest, the RAN route corresponding to the room phone's language will be used to announce the wake-up message.

For more information on AWU, Multi-Language Wake-Up, or other hospitality features, refer to *X11 features and services*. For information on service change programs, refer to *X11 input/output guide*.

512-second RAN

This development provides longer message times to accommodate newer digital announcers. This feature is implemented in Trunk Route Administration (LD 16) in response to the RAN type (RTYP) prompt:

- The DGT response provides message lengths up to 256 seconds in continuous mode.
- The CON response provides message lengths up to 608 seconds in continuous mode.
- The CAP response allows message lengths of 608 seconds in start-stop operation.

To operate in continuous mode:

- Program the RAN route type for Audichron format.
- Set switch 3 on the QPC74 card to ON for each unit programmed for continuous mode (see [Tables 41](#) and [42](#)).

On NT7M and 213300 series machines, set switches on the recorded announcement machines as follows:

- Set Control Processor switch S6-7 ON (all others OFF).
- Set Line Expansion Chassis switch S2 and S3 OFF.

Start-stop mode allows for multiple messages; however, multiple messages are shorter than the continuous mode by a divisor of the maximum message length. That is, each of four messages are only one quarter of 512 seconds, equaling 128 seconds. For start-stop mode:

- Program the RAN route for Code-A-Phone format.
- Set switch 2 on the QPC74 card to ON for each unit programmed for continuous mode (see [Tables 41](#) and [42](#) on [page 164](#)).

Note: For more information on option switch settings, see [“Configuration” on page 162](#).

Recorded announcement machines

Customer-provided recorded announcement machines must be compatible with the RAN trunk. This section lists several recorded announcement machines that have been tested for compatibility with the recorded announcement trunk card.

Cook Electric digital announcers

The Cook Electric digital announcers store messages in solid-state message chips using digital coding. These machines are available in one, two, four, six, or eight channels. The Cook Electric digital announcers provide the following optional features:

- 1- to 8-minute recording
- up to 200 lines per trunk
- trunk-based SIT tones
- battery back-up
- remote record
- line or trunk configurations
- continuous run mode
- peg counts
- four different start options

The various models of recorded announcement machines that are compatible with the RAN trunk are listed below:

Cook Electric NT5M series The Cook Electric NT5M series provides:

- two-, four-, six-, or eight-channel configuration
- 1-minute standard recording time
- seven firmware options
- an audio input jack
- switch-selectable options
- 32- or 64-kbps sampling rate
- automatic gain control

Cook Electric NT7M50AA series The Cook Electric NT7M50AA provides:

- two independent variable-length announcements
- two audio outputs

Note: This model is listed for reference only. It is no longer available from the manufacturer.

Cook Electric model NT7M25AA The Cook Electric NT7M25AA provides:

- four independent variable-length announcements or a single message of longer duration, depending on selected firmware
- four audio outputs
- four-channel, four-port synchronous messaging
- four-port demand phase, four-channel fixed message length

Note: This model is listed for reference only. It is no longer available from the manufacturer.

Cook Electric model 21330 The Cook Electric Model 21330 provides:

- single channel (trunk route)
- variable-length announcement

Note: This model is listed for reference only. It is no longer available from the manufacturer.

Cook Electric model 213400 The Cook Electric Model 213400 provides:

- four independent variable-length announcement channels (trunk routes)
- total announcement duration of 2 to 192 seconds (divided among the four channels)

Note: This model is listed for reference only. It is no longer available from the manufacturer.

Audichron HQ-1 112 or Cook Electric 212

The Audichron HQ-1 112 or Cook Electric 212 provides:

- continuous mode operation
- 12 independent channels (trunk routes) per machine
- maximum of five independent announcement channels per customer
- several RAN trunks can be bridged to each channel as required
- announcement duration of 6.5 or 13.5 seconds
- multiple-customer usage of announcement machine

Code-A-Phone 210DC

The Code-A-Phone 210DC provides:

- start-stop machine
- single channel (trunk route)
- single announcement
- announcement duration of up to 3 minutes
- rewind time 1/6 of the announcement time
- single-customer usage of announcement machine
- several RAN trunks can be bridged to each machine

Note: This model is listed for reference only. It is no longer available from the manufacturer.

QAY1 Announcer

The QAY1 Announcer provides:

- start-stop machine
- 12 independent channels (trunk routes) per machine
- maximum of five independent announcement channels per customer
- several RAN trunks can be bridged to each channel as required
- announcement duration of 14 or 28 seconds
- multiple-customer usage of announcement machine

Note: For more complete information on these product options, consult the product specifications.